

What Is Claimed:

Claim 1. In a method using a formed grinding wheel to grind a member having an external developed surface with at least two segments,

the improvement of locating one segment of the developed surface with a positioning roll connected to a moveable clamp prior to grinding a different segment of the developed surface.

Claim 2. The method of claim 1 wherein the one segment of the developed surface has a valley having a size and characterized in that the positioning roll has a size greater than the size of the valley with the positioning roll having a two point contact with such valley.

Claim 3. The method of claim 1 characterized in that a line from the center of the positioning roll of the positioning roll to the different segment of the developed surface forms an angle less than  $45^{\circ}$ .

Claim 4. The method of claim 2 characterized in that a line between said two points of contact with the valley is between  $0^{\circ}$  and  $60^{\circ}$  in respect to a segment through the center of said positioning roll and the center of said line.

Claim 5. The method of claim 2 wherein the formed grinding wheel has an axis of rotation and characterized in that a line extending through said two points of contact of the positioning roll with the valley intersects the axis of rotation of the formed grinding wheel at an angle of between  $0^{\circ}$  and  $60^{\circ}$ .

Claim 6. The method of claim 1 characterized in that two or more positioning rolls are utilized.

Claim 7. The method of claim 1 characterized in that three or more positioning rolls are utilized.

Claim 8. The method of claim 2 characterized in that said two points of contact is established by two different positioning rolls.

Claim 9. The method of claim 2 wherein the member is a rotor and characterized in that a segment line running through the two points of contact is substantially perpendicular to a line running from the center of the rotor through said segment line.

Claim 10. The method of claim 9 characterized in that there are multiple positioning rolls, multiple segments, and multiple perpendiculars.

Claim 11. The method of claim 2 wherein the member is a rotor with main lines of action in respect to a certain valley and characterized in that said points of contact are within said main lines of action.

Claim 12. The method of claim 2 wherein the member is a rotor with main lines of action in respect to a certain valley and characterized in that said points of contact are at said main lines of action.

Claim 13. The method of claim 2 wherein the member is a rotor with main lines of action in respect to a certain valley and characterized in that said points of contact are outside of said main lines of action.

Claim 14. The method of claim 2 characterized by an additional developed surface and an additional positioning roll and said additional positioning roll having a one point contact with said additional developed surface.

Claim 15. The method of claim 1 characterized in that the one segment of said developed surface is rough ground as a reference surface prior to production grinding the different segment of the developed surface.

Claim 16. The method of claim 1 wherein there are two positioning rolls and the member has first and second segments of the developed surface and at least a third segment of the developed surface,

characterized by grinding the first and second segments in succession, and engaging the first and second segments with the positioning rolls respectively before grinding the third segment.

Claim 17. The method of claim 16 wherein a finished segment has a certain size and characterized in that the first and second segments are ground oversized as reference grinds while the third segment is ground as a finished segment of its certain size.

Claim 18. The method of claim 16 characterized in that the two positioning rolls are angularly spaced by a certain number of degrees and the first and second segments are angularly spaced by the same number of degrees for engagement therewith prior to grinding the third segment.

Claim 19. The method of claim 18 characterized in that the third segment is adjacent to one of the first or second segment.

Claim 20. The method of claim 16 characterized in that the first and second segments are angularly spaced by substantially  $180^{\circ}$ .

Claim 21. The method of claim 17 wherein the member has a fourth segment and after the third segment is ground the member is indexed such that the two positioning rolls are engaged with differing surfaces of the first and second segments respectively prior to grinding the fourth segment.

Claim 22. The method of claim 21 wherein the member has a fifth segment and after the fourth segment is ground, the member is indexed such that the two positioning rolls are engaged with the third and fourth segments prior to grinding the fifth segment.

Claim 23. The method of claim 22 wherein the member has a sixth segment and after the fifth segment is ground, the member is indexed such that the two positioning pieces are engaged with differing surfaces of the fourth and

fifth segments respectively prior to grinding the sixth segment.

Claim 24. In an apparatus using a formed grinding wheel to grind a member having an external developed surface with at least two segments,

the improvement of a location means to locate one segment of the developed surface with a positioning roll connected to a moveable clamp prior to grinding a different segment of the developed surface.

Claim 25. The apparatus of claim 24 wherein the one segment of the developed surface has a valley having a size and characterized in that said location means utilizes a positioning roll a size greater than the size of the valley with the positioning roll having a two point contact with such valley.

Claim 26. The apparatus of claim 24 characterized in that a line from the center of the positioning roll to the different segment through the bottom of the developed valley being ground forms an angle less than  $60^{\circ}$ .

Claim 27. The apparatus of claim 25 characterized in that a line between said two points of contact with the valley

is between  $0^{\circ}$  and  $60^{\circ}$  in respect to a segment perpendicular through the center of said positioning roll and the center of said line.

Claim 28. The apparatus of claim 25 wherein the formed grinding wheel has an axis of rotation and characterized in a line extending through said two points of contact of the positioning roll with the valley intersects the axis of rotation of the formed grinding wheel at an angle of between  $30^{\circ}$  and  $60^{\circ}$ .

Claim 29. The apparatus of claim 24 characterized in that said locating means utilizes two or more positioning rolls.

Claim 30. The apparatus of claim 24 characterized in that said locating means utilizes three or more positioning rolls.

Claim 31. The apparatus of claim 25 characterized in that said locating means utilizes two points of contact established by two different positioning rolls.

Claim 32. The apparatus of claim 25 wherein the member is a rotor and characterized in that said locating means

utilizes a segment line running through the two points of contact substantially perpendicular to a line running from the center of the rotor through said segment line.

Claim 33. The apparatus of claim 32 characterized in that said locating means utilizes multiple positioning rolls, multiple segments, and multiple perpendiculars.

Claim 34. The apparatus of claim 25 wherein the member is a rotor with main lines of action in respect to a certain valley and characterized in that said locating means utilizes points of contact within said main lines of action.

Claim 35. The apparatus of claim 25 wherein the member is a rotor with main lines of action in respect to a certain valley and characterized in that said locating means utilizes points of contact at said main lines of action.

Claim 36. The apparatus of claim 25 wherein the member is a rotor with main lines of action in respect to a certain valley and characterized in that said locating means utilizes points of contact are outside of said main lines of action.



Claim 37. The apparatus of claim 25 characterized by an additional developed surface and an additional positioning roll and said locating means utilizes said additional positioning roll having a one point contact with said additional developed surface.

Claim 38. The apparatus of claim 24 characterized by grinding means to rough ground one segment of said developed surface as a reference surface prior to production grinding the different segment of the developed surface.

Claim 39. The apparatus of claim 24 wherein there are two positioning rolls and the member has first and second segments of the developed surface and at least a third segment of the developed surface,

characterized by means for locating the first and second segments in succession for grinding, and means for engaging the first and second segments with the positioning rolls respectively before grinding the third segment.

Claim 40. The apparatus of claim 39 wherein a finished segment has a certain size and characterized in that the first and second segments are ground oversized as reference grinds while the third segment is ground as a finished segment of its certain size.

Claim 41. The apparatus of claim 39 characterized in that the two positioning rolls are angularly spaced by a certain number of degrees and the first and second segments are angularly spaced by the same number of degrees for engagement therewith prior to grinding the third segment.

Claim 42. The apparatus of claim 41 characterized in that the third segment is adjacent to one of the first or second segment.

Claim 43. The apparatus of claim 39 characterized means to angularly space the first and second segments by substantially  $180^{\circ}$ .

Claim 44. The apparatus of claim 40 wherein the member has a fourth segment and after the third segment is ground the index means are utilized such that the two positioning rolls are engaged with differing surfaces of the first and second segments respectively prior to grinding the fourth segment.

Claim 45. The apparatus of claim 44 wherein the member has a fifth segment and after the fourth segment is ground,

the index means indexes the member such that the two positioning rolls are engaged with the third and fourth segments prior to grinding the fifth segment.

Claim 46. The apparatus of claim 45 wherein the member has a sixth segment and after the fifth segment is ground,

the indexer means indexes the member such that the two positioning pieces are engaged with differing surfaces of the fourth and fifth segments respectively prior to grinding the sixth segment.

Claim 47. The apparatus of claim 45 characterized in that the first and second segments are coextensive with the fifth and sixth segments.

Claim 48. The apparatus of claim 45 characterized by engagement means for engaging the fifth and sixth segments with the two positioning pieces prior to regrinding one of the first or second segments.

Claim 49. The apparatus of claim 24 using a formed grinding wheel to grind a member having an external developed surface with at least three segments,

the improvement of locating means for locating two segments of the developed surface with positioning rolls connected to a moveable clamp and then using a grinding means to grind a different segment of the developed surface.

Claim 50. The apparatus of claim 49 wherein there are two segments of the developed surface having a valley having a size and characterized in that the positioning rolls engaging same respectively have a size greater than the size of the valley with such positioning rolls having a two point contact with such valley.

Claim 51. In the apparatus of claim 24 using a formed grinding wheel to grind a member having an external developed surface with at least four segments,

the improvement of means for locating three segments of the developed surface with positioning rolls connected to a moveable clamp prior and using a grinding means to grind a different segment of the developed surface.

Claim 52. The apparatus of claim 51 wherein there are three segments of the developed surface having a valley having a size and characterized in that the positioning rolls engaging same respectively have a size greater than the size of

the valley with such positioning rolls having a two point contact with such valley.

Claim 53. The apparatus of claim 52 wherein the member has a seventh segment and indexing means to index the member after the sixth segment is ground,

such that the two positioning rolls are engaged with the fifth and sixth segments prior to grinding the seventh segment.

Claim 54. The method of claim 53 wherein the member has a eighth segment and indexing means to index the member after the seventh segment is ground,

to index the member such that the two positioning pieces are engaged with differing surfaces of the fifth and sixth segments respectively prior to grinding the eighth segment.

Claim 55. The method of claim 54 characterized in that the first and second segments are coextensive with the seventh and eighth segments.

Claim 56. An apparatus for positioning a <sup>(1)</sup>member <sub>(3,4)</sub> having a developed surface in respect to a grinding wheel

having an engagement angle, the developed surface including a segment,

the apparatus including a fixture and engagement means to engage said fixture with the segment in a direction substantially perpendicular to the engagement angle of the grinding wheel.

Claim 57. The apparatus of claim 56 characterized in that said engagement means includes movement of said fixture.

Claim 58. The apparatus of claim 56 wherein the fixture contacts the segment at two points.

Claim 59. The apparatus of claim 56 characterized by the addition of means to move the grinding wheel to grind oversized reference grinds until one such reference grind is in engagement with said fixture.

Claim 60. An apparatus for positioning a member having a segment of a developed surface,

the apparatus including a positioning fixture and said positioning fixture contacting the segment at two points.

Claim 61. The apparatus of claim 60 characterized in that said positioning fixture includes a roll.

Claim 62. The apparatus of claim 61 wherein the segment has a size and said roll having a size greater than the size of the segment.

Claim 63. The apparatus of claim 62 characterized in that said positioning fixture is external to the segment.

Claim 64. An apparatus of claim 62 wherein the member is a rotor having main lines of action and characterized in that said two points of contact are located within said main lines of action.

Claim 65. In an apparatus for positioning a rotor having a valley inclusive segment, the valley having a size, the improvement of a positioning roll, said positioning roll having a size, said size of said positioning roll being greater than the size of the valley and said positioning roll being in contact with the valley to position the rotor.

Claim 66. A contact surface for retaining a rotor in respect to an arbor, the rotor having a valley and an end surface,

the contact surface comprising a ring, said ring being smaller than the valley of the rotor, and said ring being in contact with the end surface of the rotor.

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